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GENERAL INFORMATION

No. 38

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USSR Economy and Industry

GENERAL INFORMATION

No. 38

This serial publication provides excerpts or full translations of articles concerning the USSR economy and industry as reported in the world press, primarily the newspapers and periodicals of the USSR. Portions of original text omitted from excerpts are indicated by ellipses. Source identification accompanies each article.

Although basically on the same subjects covered in USSR Economy and Industry: Current Developments -- policy, planning, management, change and innovation, theory, technology and production -- the articles selected for this publication are usually more general in nature, of greater length, and of lesser priority. Economic and industrial items for which JPRS has no specific series, or items dealing with more than one specific industry or sector of the economy, are also included in this publication.

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REVAMPING THE MINISTRY OF LIGHT AND FOOD INDUSTRY

/Following is a translation of an article by S. Balbekov in the Russian-language daily newspaper Pravda (Truth), Moscow, 29 July 1966, page 2./

With whomever you talk in the ministry, they all complain about being overburdened with work: "We stay overtime; we bustle about; an important problem is sometimes resolved formally, but we cannot fit it into our schedules. We are short of personnel; our staffs are small." This theme is echoed in all quarters.

And actually, personnel are very busy. It is difficult to keep a needed person in one place and talk with him for even a quarter of an hour. Now others come to talk with him, now he is suddenly summoned by a superior. Moreover, if the person we want works in a branch main administration, he quite frequently has to hurry from Staropanskiy Pereulok to Prenenskiy Val /Embankment/.

In the Main Administration for Textile Machines, for example, a log of the departures of staff members is kept. Here the dates, names, and times of departure are entered. Infrequently does one see the following notations: to plant, to institute, to the Ministry of Light Industry USSR. On the other hand, from day to day several personnel of the main administration are sent to their ministry on Presnenskiy Val. The purpose of the departure: conferences, preparation of orders and information for the staff, changes in plans, "formulation" of overexpenditures, refinement of pr ces, reconciling of norms, etc.

And the point at issue is not only in the fact that the establishment is located in two buildings. Of course, trips there and back take up time. But the workers too, working in one or another of the buildings, often cannot be brought together. It is necessary to separate, to reject one person and turn to another to go to a conference, a meeting, to the adjoining division, and to another administration.

The ministry gives little attention to the scientific organization of production and labor at enterprises. The staff frequently, for example, has discussed the question of the rhythmical turning out of production, the question of the introduction of systems of network and continuous production scheduling planning. Unfortunately, in the apparatus of the ministry itself

no one is concerned with the scientific organization of labor.

"We read the literature on problems of organization and management with great interest, we know that this is very important," I was told in the ministry. "But what can we do if we don't have modern equipment? If they would give us organizational equipment, that would be a different story altogether."

It really is true that equipment is in short supply. Analytical research is carried out with the aid of antiquated office calculators. Even the arithmometers have to be taken on loan at the Moscow plants. There are only a handful of calculating machines. There are not enough ordinary typewriters. It is true, there are a few photocopying machines. In the entire ministry there are three stenographers. There are two dictating machines, but they are not used. Battles wax over the use of telephones.

But papers, information, and reports are being prepared, sent, and "unloaded" in ever mounting numbers. Their "production" is growing at rates faster than those of machines and instruments. It is sufficient to state that from January to May the "document turnover" has increased by 60 %! And hopes that this landslide will be curtailed are barely tenable.

Equipment would of course be of assistance here. However, the proper organization of administration work depends not only on equipment. In my opinion, "overloads" and shortcomings in the work of the ministry occur often because it has too many subdivisions: 23 main and other administrations, five independent divisions, a main inspection office on quality control, a central accounting office, and a secretariat. The administrations in their turn are broken down into divisions and groups. Forces are dissipated, and in fact, duties, methods of work of each link, and its place in the complete "orchestra" have still not yet been clearly designated. From this stems the duplication and lack of coordination in actions and the excessive outlays in time.

At times it is hard to know who actually, for example, is responsible in the ministry for the status and progress in the production of refrigerators and other daily appliances -- the branch administration of the Glavbytmashpribor [transliterated] or the All-Union Amalgamation of Electrical Appliances and Instruments. From several decisions of the staff it follows that simultaneously both of these wholly independent and in some cases competitive organizations are accountable. There is especially a lot of duplication and lack of coordination in the work of the branch administrations and the so-called functional services of the ministry. How many facts bear this out!

One is left with the impression that the ministry takes on itself a burden beyond what it can bear, attempts to encompass the unencompassable, and excessively loads its apparatus with "current scheduling." It not only is reconciled with duplication in the work of its subdivisions, but has not done what is important -- delimit what its administration must do and what the enterprises must do. It is precisely this that accounts for, in the first place, the overloading of the ministry coworkers. From this stems also the effort to take up many questions at the same time, which only prolongs matters, and does not afford the opportunity to check in time the compliance with orders and instructions.

In a situation where at the same time the same questions are the purview of several subdivisions among whom there is no strict delimitation

of functions, duties, and rights, frequently irresponsibility, red tape, and a bureaucratic approach to affairs appear. Coworkers do not resolve to act competently and independently. Instead of themselves doing what they have to do, personnel begin to overload this assignment on someone else, or they turn to their superior chief.

At a meeting of the activists of the ministry and in conversations with Pravda correspondents, many heads of enterprises have stated that frequently the heads of divisions and coworkers of branch administrations do not resolve the simplest kinds of questions. Each time they have to go directly to the chief of the main administration. But sometimes he advises that they write to some functional administration, or to the minister or his deputies. Not securing a conclusive response from the ministry, the enterprises often turn to local party organs for cooperation and for an intermediary.

Here are some lines from a letter of the Tashkent Oblast Committee of the CP of Uzbekistan to the minister: "In spite of repeated references of the plant on this question from December 1965 to the present in the corresponding instances, including the Main Administration for Textile Machines, no positive results have ensued . . . The oblast committee requests your intervention. . ."

The Biysk City Party Committee has written the ministry on the allocation of funds for the reconstruction of the Prodmash Plant, the Ivanovo Oblast Party Committee -- on the draft goal for reconstruction of the carding machine plant, the Leningrad City Committee -- on the proffering to enterprises bank loans, etc. In a word, party organs must come before the ministry in the role of stewards for its plants on purely economic matters.

At the same time, the ministry in several cases has attempted to divest itself of concern over the solution of economic tasks and place it on the shoulders of local party organs. Thus, it has approached the Odessa Oblast Party Committee with the request to part with the area under construction of a Pioneer camp, to the Chernovtsy Oblast Committee -- to improve the course of construction of the complex to be commissioned at the plant, to the Orlov City Committee -- to accelerate the decision of the city executive committee of the party on securing the square and releasing the architectural-planning goal for the reconstruction of the enterprise, to the Ivanovo Oblast Committee -- on allocating one steam boiler to the Shuya Plant, etc.

What must the ministry apparatus be and how must it operate? The answer is clear. It was set down with exhaustive completeness at the September Plenum of the Central Committee of the CPSU. It is emphasized that it is necessary to elaborate the simple structure of the ministries with limited staffs. Why? Because enterprises and economic amalgamations have been granted greater rights and there is no need to set up an apparatus that would deal with petty matters over the enterprises.

In the Ministry of Machine-building for Light and Food Industry and Daily Appliances it is stated that their branch has its following characteristics: many small plants. It is hard for such enterprises to be independent. They are in need of re-examination. This is true in part.

The ministry is planning to institute the consolidation of several plants. But this good intention already is encountering difficulty.

The point of the matter is that even plants neighboring closely are in different main administrations. For example, 12 Leningrad plants of the ministry are subordinated to six main administrations, seven Kiev plants -- to five, seven Odessa plants -- also to five, five Rostov plants -- to five, five Orlovo -- to four, four Sverdlovsk -- to three, etc. This promotes specialization of production, but encumbers the resolution of several inter-plant and general-branch questions. They include the combination of production lines, the most rational organization of repair and other operations, the manufacture of instruments, castings, forgings, and the consolidation of enterprises. Some branch administrations are not interested in reducing their number of plants, which are only few in number. But in other administrations there are dozens of small plants, but they are in different cities and rayons.

Setting up of cost accounting amalgamations would promote the overcoming of the artificial disperseness of the plants and also their small capacities. Incidentally, at the September Plenum of the Central Committee of the CPSU, it is clearly pointed out that new ministries must be based on cost accounting amalgamations, transferring to them many effective functions.

How is the problem to be dealt with? The heads of the Leningrad Machine-building amalgamation imeni Marx reported to a Pravda correspondent that the ministry thus far has not defined its relationship to this firm. The most important thing still remains unclear -- whether the firm remains or whether it will be liquidated. The first attempts "to pull it out" have thus far been repulsed, but a sub rosa course in this direction is still being felt. Thence stems the matter of "usurping" and cutting away the rights accruing to the general director of the amalgamation.

In the ministry they account for this by, they say, the conclusion that an amalgamation would be irrational. It would include plants that produce equipment both for processing of chemical fibers and for knitted wear, and for the leather-footwear industry. These plants must be transferred to at least two main administrations.

I was interested in what was thought about another amalgamation -- the Temp in Pevza. Here, three related enterprises are located; they produce a "chainlet" of spinning equipment. Not one of them has been transferred to another main administration. And nonetheless the assistant to the general director of Temp, K. L. Chichkov, told me that the ministry and his Main Administration for Textile Machines are acting just as if no amalgamation ever existed. Formally, it has not been eliminated, but actually it does not yet exist. It is not precluded that this firm also, developed close by sovnarkhozes. is not without its shortcomings. However, there is still not a single amalgamation that the ministry itself has set up.

But along with the setting up of amalgamations, we should also consider the transfer to true cost accounting branch institutes and special design bureaus, and in fact, even of individual main administrations. Nowadays the evaluation of the work of institutes and special design bureaus

does not depend on the state and improvement of production work, but on how they affect the enterprises. It turns out that these organizations are living for their own interests and not for the interests of the plants. The same situation holds true in the main administrations. Their coworkers have not yet be made materially interested in the successes of enterprises.

It would be wished to conclude the report with the words of the Minister V. N. Doyenin, read aloud at the meeting of the activists:

"We would hope that the new ministry will always work in the new way!"

As yet it is not at all working in the new way, although noticeable steps in order to elevate the branch. It is unquestionable that new methods and the new style of management of enterprises are not being irrevocably laid down in finished form. They must be sought for, elaborated, verified in practice, all the while accumulating experience.

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THE USE OF PLASTICS IN UZBEK MACHINE BUILDING

[Following is a translation of an article by N. Belyy originally entitled "Plastics Want to Serve the Machine Builders," in the Russian-language periodical Ekonomika i zhizn' (Economics and Life), No 5, Tashkent, May 1966, pages 13-15.]

Polymers have opened up new horizons in machine building. It is worthy of note that while previously plastics were viewed only as successful substitutes for metals, at present, due to the particular features of their chemical properties, they are simply irreplaceable. Without them we cannot have dependable and durable operations of machinery, equipment and instruments.

For example, plastic centrifugal pumps operate 1,800-3,600 hours, while iron pumps work 180-360. Roller bearings made from polymers serve 5-10 times longer than bronze ones, while the use of plastic gears coupled with metal ones reduces the noise from the work of a gear drive by 50-70%. Here the articles made from polymers are 5-10 times cheaper than bronze and almost 15-20 times cheaper than babbitt. The reduction in the cost of parts and articles made from plastics can also be explained by the simpler production methods. For manufacturing them they use stamping or pressure-casting instead of machining. Each ton of plastics and synthetic resins utilized in production on the average can save: 600-650 rubles in capital expenditures, 650-700 rubles in operating expenditures, and 160-170 man-hours in labor expenditures. Here we can free about 2 tons of ferrous and nonferrous metals.

It is not difficult to figure out what effectiveness can be achieved by replacing metals if we consider that in the long run approximately one-fifth of all the machinery, articles and equipment produced in Central Asia will be made from plastics. In 1970, in the machine building and electrical industries of the nation, we plan to utilize 1,100,000 tons of plastics and synthetic resins. They will replace approximately a half

million tons of nonferrous metals and around 3 million tons of rolled stock and pipe. This will make it possible to save almost a half million rubles in capital investments, and because of this there will be a drop in product costs of not less than 920 million rubles, and labor expenditures will be reduced by approximately 55 million man-days per year.

It is expected that in the tractor and agricultural machinery building of Central Asia by 1970, the expenditure of plastics per machine will increase by more than 30 times. Here the quantitative growth of polymer production will be accompanied by progressive changes in its structure: on wider and wider scales we will produce polyethylene, polyvinyl chloride, copolymers, styrene, caprolactam, foam plastics, ion-exchange carbamide, polyester and other synthetic resins.

Plastics will find wider and wider use in all branches of the Uzbekistan national economy. Parts made from capron, fiber plastics, polyethylene, aminoplastics and carbolite are no longer news. They can be found on various machines and machine tools.

The total volume of polymers employed and processed in the machine building industry of Uzbekistan in 1964 rose, in comparison with 1963, by 40%, and in 1965 increased by approximately 70%. In 1970, the industrial application of plastics will reach 121,000 tons.

Many enterprises of Central Asia (the Tashkent Textile Machine Building Plant, the Tashkent Electrical Engineering Plant, the Frunze "Red Metallurgist" Plant, and others) have accumulated good experience in utilizing polymers. Ten years ago at the Tashkent Textile Machinery Plant the first attempt was made to introduce parts made from plastics into the design of textile machinery. This attempt was successful. At that time the parts of four articles were introduced into production and have withstood the testing of time. Later on at the enterprise they set up a special section for manufacturing plastic parts, and they organized a multi-specialty brigade for introducing polymers. At present the plant is producing hundreds of types of parts from plastics.

As is known, on many of the iron and aluminum parts in casting frequently blisters and other flaws are formed. At the Tashkent Textile Machinery Plant they have worked out a procedure for plastic coating using epoxy resins for dressing the casting flaws. At present proposals are being worked out at the plant for introducing new types of plastics in production such as fiberglass, fiber plastics, plastic wood, etc. Each new machine should be better than the former. This has become the motto of the collective. And each step of the machine builders who are introducing polymers into the production of textile equipment leads to this goal.

The first part out of capron (a cutter) was developed at the Uzbek Agricultural Machinery Plant in 1962. Even then the advantage of the new material was obvious. Previously each part before assuming the

final form passed through the hands of several workers: casters, lathe operators, grinders, etc. For the capron cutters they needed only one press. The quality of the metal cutters was low and has caused complaints by the consumers. The manufacturing of the polymer cutters raised their durability and dependability in work and has made it possible to save 13,000 rubles per year.

A great deal has already been done and will be done in the area of utilizing polymers in the industry of Uzbekistan. However, even now certain specialists and leaders at the enterprises are extremely cautious in introducing plastics.

The prospects of employing polymers in Central Asia are great. But at such major enterprises as the Tashkent Agricultural Machinery Plant, the Chirchik Agricultural Machinery Plant, the Tadzhik Textile Machinery Plant, the Andizhan Machine Building Plant, and others, polymers are still employed on very meager scales. For example, at the Tashkent Agricultural Machinery Plant, it would be possible to introduce several score plastic articles (pulleys, rollers, plates, couplings, bushings, and other parts). This would make it possible to save thousands of tons of iron and aluminum. But over the five years they have used plastic to replace only 12 metal parts and a large number of them is not in mass production.

At many enterprises plastics are used chiefly for small parts such as levers, handles, and knobs. The computations at the same time indicate that at the five largest plants involved in tractor and agricultural machinery building in Central Asia it would be possible to introduce into production during the year more than 100 plastic parts, with a total weight of about 250 tons. This would make it possible to save more than 2,000 tons of ferrous and nonferrous metals. The annual economic effect would be approximately 250,000 rubles.

We should take up certain questions of production here. As is known, plastics and synthetic resins in the form in which they are produced by the chemical enterprises cannot be immediately utilized by the consumers. From the powders, granules and blocks initially one must make either intermediate products or complete parts. These operations are done with complex and frequently capricious equipment. Moreover, the processing of the plastics requires significant labor expenditures. Computations indicate that in the total plant labor-intensiveness of plastics production and parts, these expenditures reach 80-90%.

However, the branch which would process raw materials in Uzbekistan has virtually not been created, it has not been organizationally structured and does not have a serious scientific-research, design and planning base. The absence of centralized administration in this area has led to the appearance of many small shops and production areas

concerned with processing plastics, to the scattering of funds, materials, human power, and to a semi-artisan solution to the technical problems. And at the specialized plants, in comparison with the small shops and sections, they can process per unit of equipment 5-10 times more, the production area is utilized 10-20 times more, labor productivity is 5-7 times higher, and the cost of analogous articles is 1.5-2 times less.

The setting up of the branch for processing plastics is closely linked to the extensive development of scientific research work in this area. But this work as yet is being done unsatisfactorily; these problems are the concern of scattered small organizations subordinate to the various departments. The production base set up at the Tashkent PlasticsPlant also cannot satisfy the demand for plastic parts. Therefore, in the near future it is essential to create in our republic a large specialized enterprise for processing plastics. For this purpose we must obviously accelerate the expansion of production area at the Tashkent Plastics Plant as well as the assortment and range of articles, sharply improve the quality of molding and stamping, and solve the question of specialized production. We must also solve the question of setting up a large tool system for serving the enterprises employing plastics.

It should be pointed out that after completing the reconstruction of the Tashkent Plastics Plant, the scarcity of capacity for manufacturing molds will be felt even more. Therefore, even now we must think out the question of creating a specialized plant for manufacturing molds since this will help to extensively utilize polymer materials in machine building.

In our view, measures must also be taken so that the tool shop of the Tashkent Plant would provide the manufacturing of the necessary number of molds and thereby make it possible to completely utilize the plastics processing equipment existing at the plant. This will make it possible to accept orders from consumers without requiring the delivery of molds from them, as is done at present.

The experience of utilizing polymers at the enterprises of Uzbekistan leads to the idea of the necessity of creating a specialized organization which would be concerned with the introduction of plastics. With this purpose in the republic in the near future we must set up a self-supporting laboratory. It should be multi-specialty and bring together a group of economists, designers, production engineers and an experimental section.

The solution to all of these questions will make it possible to save a great deal of metal, to raise product quality and to increase the volume of industrial production.

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IMPROVING PRODUCTION AT THE ANDIZHAN MACHINE BUILDING PLANT

[Following is a translation of an article originally entitled "Before the Start," by V. Nagornova, in the Russian-language periodical Ekonomika i zhizn' (Economics and Life), No 5, Tashkent, May 1966, pages 26-29.]

The Andizhan Machine Building Plant is switching over the new forms of planning and economic incentive as of January next year. But even now effective preparation for this is being carried out so that from the very first days of operating under the new system we can fully utilize all of the economic levers for improving production.

The fact that the preparatory work cannot be put off was demonstrated to the machine builders from the following example. This year the factory price of the PU-0.5 universal loader was cut in half. The factory prices had been reduced previously, but the enterprise leaders were comforted by the fact that the losses from producing one machine would be met by the profit obtained for other types of products.

Now the situation is quite different. The plant economists have figured out that if the cost of the loader remains at the level of last year, then the enterprise will suffer almost 363,000 rubles in loss. In other words, the production of the universal loader will "eat up" a significant share of enterprise income, it will reduce the total deductions for the development of production, the socio-cultural needs and the material incentive of the workers.

The plant specialists have taken the only correct decision under the existing conditions: during the preparatory period we will see to it that the cost of the universal loader does not exceed its factory price.

Even now they have worked out a range of organizational and technical measures the fulfillment of which will make it possible to attain the desired results. A competition has been proclaimed for the best rationalizing proposal for reducing the costs of the machinery. The

volunteer design-production bureau has been instructed to introduce a new method for machining and the centrifugal lining of the loader bushings. A great economic effect will be obtained from replacing the expensive welded steel by the cheaper all-pressed steel in manufacturing the loader valves and by changing the design of the pump drive and also converting to the hot volume stamping of six parts and from reexamining the layout patterns for 60 parts.

This is only one, one might say, particular example of how the machine building plant in a concrete and businesslike way approaches the solution to tasks related to switching over to the new conditions for planning and economic incentive of production.

The plant must develop the production of several new types of machinery: a universal caterpillar-driven leveller, a motor-mounted pump, a hydraulic distributor, a mobile automatic intake centrifugal diesel pump unit, and raise the motor capacity of the modernized T-61-1 diesel.

A technical-economic conference comes to mind which was held soon after the September Plenum of the Central Committee of the CPSU. The chief engineer of the Andizhan Machine Building Plant, A. Anikin, in his speech gave the following example. In the summer of 1964, in Moscow, there was the International Exhibit of Construction and Road Machinery at which they demonstrated the equipment from many foreign nations. Here it turned out that 74% of all of the machinery presented by the foreign firms had a hydraulic drive. They on the proving grounds of the Exhibit showed themselves to be exceptionally durable in work under belt-cutting loads. They were significantly lighter than the Soviet machinery having a mechanical drive.

The advantages of a hydraulic drive were known earlier. In March 1964, it was decided to specialize the Andizhan Machine Building Plant in producing hydraulic drives, motor pumps and hydraulic distributors. But things went no farther than the discussions. For almost two years the plant was not able to get a decision on the reconstruction of production in line with the designated specialization. And all because the former Uzbek Sovnarkhoz in essence was not interested in this. In subordinating its activity to the interests of one republic, it was not capable of solving technical tasks on a national scale.

All of several months have passed since the September Plenum of the Central Committee of the CPSU, and the situation with the hydraulic drive has gotten off of dead center. Inspired by this, the plant specialists and the rank and file production workers of the enterprise with a great upsurge have busied themselves with the development of production for the motor pumps and the hydraulic distributors. Since the very first days of operating under the new system, we will begin serial production of the motor pump.

As is known, Lenin gave great significance to economically harmonious management based upon cost accounting. It must be pointed out that at the Andizhan Machine Building Plant, the cost accounting system has been introduced from the first quarter of 1965. The production shops at present receive plans for the following indices: output of articles in physical units, the number of workers, the wage fund according to categories, labor productivity, average wages and shop expenditures. Moreover, considering the specific nature of production, the casting shop receives plans in terms of the costs of the grades of iron and nonferrous castings, while the foundry and preparatory shops have expenditures on basic materials.

Price lists have been compiled for the articles and intermediate products. The labor-intensiveness of each part and the material expenditure standards have been set. All of the existing summary norms for expenditures related to the shop expenditures (expenditures on lubricants and polishing materials, uniforms and special food) have also been given to the shops.

This year an important program of measures for introducing cost accounting must be carried out. This means creating price lists for intermediate products which are turned over to the machine shops from the preparatory shops, systematizing the existing expenditure standards and developing the missing standards, and much else.

At the same time at the plant important work is being done to raise the shift coefficient for the equipment, to improve the technical standards, to raise the quality and increase the dependability of the machinery and equipment produced.

During the first quarter of the present year, we discovered the worn-out and obsolescent equipment and also equipment for which the plant has no need, so as to sell it. Instead of outmoded equipment we are installing modern more productive equipment.

At the beginning of the year, the equipment shift coefficient at the plant equalled 1.5, and by the end of the year the machine builders are firmly planning to bring it up to 1.6. In other words, the plant will "increase" the machine fleet by 35 units due to this. A great deal is being done also to further reduce the labor-intensiveness of the machinery produced. By the time we convert to the new operating conditions, labor-intensiveness will drop as follows: for the T-62-1 diesel by 1.3 norm-hours, for the S-245 pump, by 0.5, for the PU-0.5 universal loader by 47 norm-hours, and for the TKhLA reducer by 6 norm-hours.

Having carefully analyzed the possible ways for saving, the machine byilders have worked out a group of organizational-technical measures. In particular, the reduction in damage in the casting production, the more rational metal patterning, the utilization of hot volume stamping, the introduction of advanced production procedures for

casting large parts and other measures will make it possible for the plant to save during the year 43.4 tons of steel of various grades, 358 tons of iron, 15 tons of bronze, and 500 tons of auxiliary materials. This means that the enterprise can manufacture without expenditures on materials 650 diesels, 55 pumps and 17 universal loaders.

Important and responsible tasks confront the collective of the Andizhan Machine Building Plant during the first year of the Five-Year Plan. Product output will increase by 6.4%. We must manufacture 1,000 pumps and 190 universal loaders more than was planned last year. We must also remember the plans related to the development of new production. The collective is aware that this year will not be easy. Even greater difficulties will come up when the enterprise converts to the new system of planning and economic incentive. But these difficulties will be significantly less if today all of the economic and technical services of the plant do good preparation. The administration and the plant Party organization are already concerned with this.

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THE BUILDING OF THE CENTRAL ASIAN-CENTER GAS LINE

[Following is a translation of an article originally entitled "The Largest in the World," by N. Mun'ko, Candidate of Economic Sciences and senior scientific co-worker of the Economics Institute under the Uzbek Academy of Sciences, in Ekonomika i zhizn' (Economics and Life), No 5, Tashkent, May 1966, pages 85.]

In the world practice of building gas lines and pipelines in general, not often will one encounter installations which are unique in terms of length and productivity. Here one might consider the Trans-Canada Gas Line which crosses the North American continent in Canada.

And nevertheless in terms of its technical and economic indices, it is behind the Bukhara-Urals Gas Line. While the Canada Line stretches 3,670 km and has been built in a single line, the Bukhara-Urals in terms of the extent of the two lines reaches 4,000 km. The annual productivity of it is equal to 21 billion cubic meters of gas. It is more than three times larger than the Canada Pipeline.

But an even larger line will be the Central Asian-Center Line which will deliver gas from the deposits of Central Asia and Western Kazakhstan to the regions of the Central European portion of the USSR.

The plans for the gas line have been developed by the Ukrainian Main Design Institute for the Gas Industry under the USSR Ministry of the Gas Industry. The route will cross the Karakum and Kyzylkum deserts, the major water arteries and plateaus. Almost 2 million tons of pipe will be laid.

The work on building this most gigantic pipeline has already been begun and will be completed in 1969. The productivity of the first stage of the gas line equals 21 billion cubic meters per year. In the long run it will reach about 108 billion cubic meters per year, and the length of it will exceed 6,000 km. The gas of Central Asia will be delivered to

the Baltic area and Belorussia. The capital investments on building the first installation will be paid off in four years, and the second in a little more than two years.

During the initial period of operations, the raw material base of the gas line will be the major deposits of Uzbekistan, Turkmenia and Western Kazakhstan, including the already existing ones of Uchkyr, Bayramali, Zeagli-Darvaza, and subsequently newly discovered deposits.

Regardless of the distance of transporting the gas over the Central Asian-Center Gas Line, the cost of the Uzbek and Turkmen gas converted into a ton of conditional fuel units according to the long-range economic indices for the various types will be more than two times cheaper than the Moscow, Kuznetsk or Donets coals.

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THE FIVE-YEAR PLAN IN ACTION: THE FUEL-ENERGY BALANCE

[Following is a translation of an article by A. Pavlenko, member of the USSR Planning Committee, Chief of the Division of Power Engineering and Electrification, in the Russian-language weekly Ekonomicheskaya Gazeta (Economic Gazette), Moscow, No 37, Sep 1966, pp 5-6.]

The main task of the fuel-energy balance is to determine on a scientific basis the optimum proportions of production and the most efficient methods of use of fuel energy resources for the entire national economy of the country as well as for individual economic regions. For these regions it is necessary to take into account the specific conditions of consumption of various types of fuel by all branches of industry, transportation, and agriculture. The fuel-energy balance can be briefly described as the balance between the output and consumption of all types of fuel and power.

In the current five-year period, the country's power capabilities will grow at a rapid rate, and the development of the fuel industry is being considerably accelerated. During the years 1966-1970, further improvement of the fuel-energy balance structure will take place.

The 23-rd CPSU Congress emphasized the necessity of closer coordination of production plans with distribution plans, and of attaining better utilization of all resources of the national economy. The USSR fuel-energy balance for 1966-1970 is being compiled in accordance with the Directives of the new Five-year plan.

The most important factors.

Nearly one and a half billion tons of conventional fuel will be the level achieved by the total consumption of all types of fuel energy resources by our country in 1970. This is approximately 1.4 times greater than the consumption in the last year of the seven-year period, and will be 2.2 times greater than the 1958 consumption.

The output of electric power is growing most rapidly of all. Its consumption per person of the Soviet population in 1958 was 1,145 kilowatt-hours, 2,200 in 1965, and it is planned to raise it to 3,300-3,450 kilowatt-hours in 1970. The increase for all forms of fuel energy resourc

is also considerably great. In 1958, 3.27 tons of conventional fuel were used per person, 4.67 in 1965, and 6.05 are planned for 1970.

According to these indicators, our country has closely approached such industrially highly developed capitalist countries as England, France and the German Federal Republic. For comparison, indices for these states are presented. In England, the 1964 consumption was 3,400 kilowatt-hours and 3.65 tons of conventional fuel per person; in France, 2,050 and 1.8 respectively, and in the FRG, 2,900 and 3.5. In this respect, we are lagging only behind the United States of America.

The necessary increase in the output of fuel energy resources and the development of the electric power base are achieved by the rather large capital investments by our State. During the past seven-year period, these purposes were allotted nearly a third of the capital investments into industry and transportation, including 6.7% for development of the coal industry, 15.1% for petroleum and gas, and 11.1% for the construction of electric power stations and networks.

In addition, the consumers of fuel, heat and electric power themselves expend significant amounts for the construction of boiler-rooms, power distribution systems, substations, industrial furnaces, etc. A number of calculations show that more than half of the capital investments allocated to industry and transportation are used for development of the fuel and power economy of the country. Approximately the same ratio is in effect for this five-year period as well.

In this connection, it should be considered especially important to ensure the most efficient and economical development of the fuel and power branches themselves as well as the maximally effective use of fuel, electric power and thermal energy in the national economy. Calculations show that in 1970, the saving of only one percent of the fuel and power resources is equivalent to a saving of about 15 million tons of conventional fuel on the scale of the national economy, as well as up to one and a half billion rubles of capital investments, and a reduction of annual operating costs by no less than 300 million rubles.

Correct evaluation of fuel costs and stimulation of efficient use.

Saving of fuel-energy resources is of the first order of importance in the European part of the USSR. Our country as a whole is well endowed with potential fuel and power resources, but they are unequally distributed over its territory. The European portion (including the Urals) contains only about ten percent of these resources; and their production here is about twice as costly as in the Eastern regions.

At the same time, the productive capacities of the country are most highly developed precisely in the European portion. It is already necessary to transport fuel from afar (coal from the Kuznetsk, gas from Central Asia).

Transportation of fuel over great distances greatly increases its cost to the consumer. Thus, if calculated costs for Kuznetsk coal at the place of its production are 10.85 rubles per ton of the conventional fuel, then with the addition of transportation costs, the sum increases to 17.4 rubles in the European part of the country.

From the preceeding it is obvious how important it is to encourage efficient fuel consumption, and first of all in the European part of the country. Unfortunately, the presently established selling prices

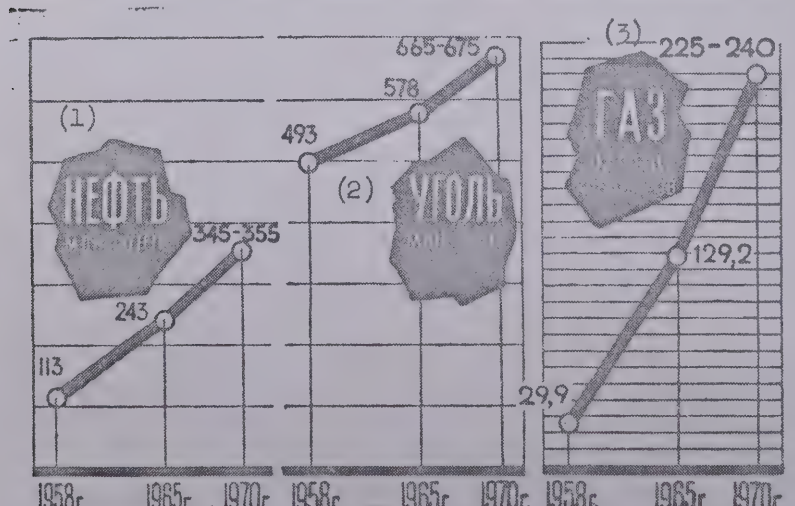
for fuel are not conducive to this. It is known, for example, that the existing prices of coal are below its production cost. They in no way reflect the effectiveness of capital investments in this branch of industry.

Economic reform and the shift to the new system of planning and economic stimulation are, as is known, associated with a review of wholesale prices of industrial products for the purpose of the closest approximation of prices to the level of socially necessary expenditures of labor. This concerns the wholesale prices of coal, petroleum, tars and other forms of fuel as well as electric power and thermal energy.

The production part of the balance and changes in the fuel output structure.

For the fullest and most correct use of fuel-energy resources, of great importance is the working out of optimum balances for each economic region. It is necessary to determine in detail the demand for fuel-energy resources as well as the means for the most efficient satisfaction of this demand in these balances. Such a problem can be properly solved only with the combined efforts of workers of all planning organizations, ministries and agencies, design and research institutes and industrial enterprises. It is known that at present, oil and gas are the most economical forms of fuel. In the past seven-year period, although the production of natural gas was increasing slower than had been originally planned, the structure of the fuel balance underwent considerable progressive changes. Thus, in 1958 the production of oil and gas was (in relative calculation) little more than half of the coal output, but in 1965 it was by 18% greater than the coal output.

The current five-year plan anticipates further accelerated development of the petroleum and gas industries. But it was pointed at the 23-rd Party Congress that concern for the coal industry, which plays an important role in supplying the country with fuel, cannot be decreased, as was the case in recent years. Diagram 1 represents the dynamics of the growth of petroleum, gas and coal production.



KEY:
(1) Petroleum in million tons
(2) Coal in million tons
(3) Gas in billions of cubic meters

Diagram 1. Dynamics of the growth of petroleum, coal and natural gas production for the seven-year period and according to the plan for 1966-1970.

In the recent past, a certain underestimation of the economic effectiveness of production and consumption of peat was also permitted to occur. Calculations show convincingly that in the regions of Western Siberia, Vologda, Cherepovets, Kirov, Kalinin and a number of other cities, the use of peat at the GRES /State regional electric power stations/ and especially at heat and electric power stations is more justified than use of any other fuel brought in from elsewhere.

In the fuel-energy balance of pre-revolutionary Russia, the proportion of wood was very great. In last year's balance of the USSR, its share was only several percent. A further decrease of the use of wood for power production is anticipated by the end of the five-year period.

In the course of the five-year period it is planned to significantly increase the use of secondary power sources — blast furnace gas and waste heat from industrial plants. Calculations show that expenditures for installation of special equipment (utilization boilers etc.) are recompensed in short periods of time (from several months to 2-3 years).

In 1965 the use of secondary power sources made it possible to economize 27 million tons of conventional fuel. But the possibilities here are such that by 1970 this figure will be increased to 40 million tons, and in the future to 75 million tons of conventional fuel. In this connection it is planned to sharply increase the production of utilization boilers (by $2\frac{1}{2}$ times). Ministries and agencies should devote more attention to use of secondary power sources.

Changes in the composition of the output portion of the fuel-energy balance are shown in Diagram 2.

Such progressive changes in the composition contribute a great effect to the national economy. If the average unit cost of conventional fuel in 1958 is taken as 100 percent per ton, then in 1965 it had dropped to 76 percent, and will become 64 percent by 1970. The actual economy will be even greater; after all, using fuel of higher quality will make it possible for consumers to use it more efficiently.

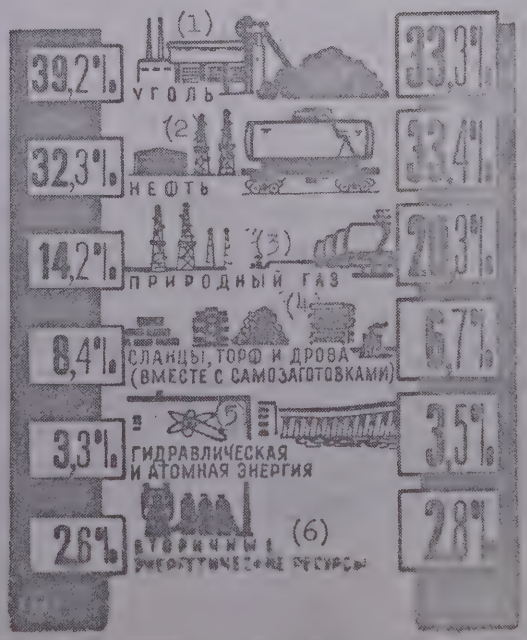


Diagram 2. Changes in the composition of the output portion of the fuel-energy balance (in percent of the total output of resources) for the five-year plan.

KEY: (1) Coal
(2) Petroleum
(3) Natural gas
(4) Shale, peat and wood (including self-obtained stores)
(5) Hydroelectric and nuclear power
(6) Secondary power sources

The consumption part of the balance.

The structure of the consumption part of the fuel-energy balance (not including losses during production or transportation, export and use for non-fuel needs) is represented in Diagram 3.

The diagrams show that in connection with further electrification of industry and agriculture, fuel consumption for the production of electric power increases; at the same time the shift of the railroads to diesel and electric engines is accompanied by a reduction of fuel consumption.

Diagram 3. Changes in the structure of the consumption part of the fuel-energy balance (not including losses during production and transportation, export and non-fuel uses) according to the five-year plan.

KEY: (1) For production of electric power
(2) For production of various types of thermal energy (steam, hot water)
(3) Industrial kilns and other installations
(4) Mobile power plants (transportation of all types and agricultural mobile machines)

It should be noted that thermal balances have been the least studied. Republic planning organs have only recently begun working on these questions. So far, heat balances are being compiled only for centralized installations producing steam and hot water. Yet, as analysis shows, their share is only 55% of the total heat requirements. Evidently it is necessary to seriously begin studying the questions not only of centralized, but also decentralized heat supply as well, which is at present being accomplished by uneconomical heating stoves, cemented-in kettles, etc.

In determining future requirements of electric power for the five-year period, two circumstances were considered. As is known, electricity is increasingly used in industrial processes and in the daily life of the population. Consequently, the consumption of electric power should constantly increase. It must be kept in mind, however, that a gradual reduction of proportional consumption of electric power is taking place at the same time. According to the Directives of the 23-rd Party Congress, the norms of its consumption in industry are to be decreased by 6-8 percent during the five-year period.

Efforts of all workers involved with the designing and operation of equipment and installations using electric power must be directed toward the attainment of this goal. It is necessary to develop and apply scientifically based norms for its consumption in various processes and forms of production.

At the present time, many proportional norms are based on statistical data. At the same time, analysis shows that use of the same equipment in the same industrial processes results in the proportional norms at some plants being one and a half to two times greater than at others. Production of several types of industrial output involves proportional norms of electric power consumption that are considerably above those attained abroad.

Scientific research institutes are still inadequately assisting the planning organs and enterprises in developing and applying scientifically validated norms for power consumption. In some cases even the reverse takes place.

Thus, at one time there appeared the instruction to at least double the illumination norms when replacing incandescent bulbs with fluorescent lighting, allegedly because people do not see as well with the new type of lamps. This totally unfounded requirement led to an acute distortion of the actual economic effectiveness of fluorescent lamps. For example, to produce a luminous flux of one million lumens, calculated expenditures using incandescent lamps are 4,975 rubles, and 2,725 rubles with fluorescent lamps. In order to double the illumination in the second case, the expenditures would be 5,400 rubles. With such a method of calculation it turned out that fluorescent lighting is not always advantageous; and for this reason its introduction was being delayed. This error is now being corrected. It is planned to greatly increase the production of fluorescent lamps during the five-year period. According to preliminary calculations, in 1970 it will be possible to save 10-15 billion kilowatt-hours worth of electric power by virtue of new forms of lighting.

Ways and sources of fuel economy.

The task has been set of reducing the norms of fuel consumption for the production of electric power by 11-14% during 1966-1970 (See Fig. 4.).

This depends primarily upon increasing the unit capacity and the capacity of the electric power stations as a whole, raising steam parameters, development of combined production of heat and electric power (thermal power), and improving the quality of fuel.

In the course of twelve years (1959-1970) the capacity of the largest electric power stations will increase from 750,000 kilowatts to 2.4 million kilowatts, and the unit capacity from 150 to 800 thousand kilowatts.

Our efficiency of construction and operation of electric power stations has increased. This is completely indisputable. However, in regard to fuel utilization, many major shortcomings still remain in them. It should be noted that the ratio of fuel consumption is higher in our country than in US electric power stations. This is primarily explained by the existence of a large number of small, inefficient stations and slowness of placing in operation new, economical power units of 300,000 kw.

Combined production of heat and electric power at heat and electric power stations is still being carried out on a small scale. Many heating turbines are operating as condensation turbines.

Increased economy at electric power stations is made difficult because of frequent changeovers from one brand or grade of fuel to another. The type of fuel at such electric power stations as the Novokuybyshevskaya TETs No. 1, the Kirovskaya GRES and others has been changed two or three times. Although this was to a certain degree caused by straining of the thermal balance, such order, or more precisely, disorder, should not be tolerated.

It is necessary to increase the responsibility of fuel suppliers; perhaps a shift to direct contacts between electric power stations and mines should be made.

A significant portion of fuel-energy resources is consumed in industrial kilns and installations of plants and factories. More than half of the total use of these resources in industry falls to the share of ferrous metallurgy. In addition, this branch uses high-quality and scarce grades of coal. This is why it is so important to first of all ensure the most efficient use of fuel in ferrous metallurgy. Much has already been done to these ends. Enterprises are beginning to use natural gas, oxygen blast process, and evaporation cooling of the furnaces. However, the possibilities of further fuel economy are sufficiently great. This can be seen from the fact alone that evaporation cooling is being used at not much more than half the open hearth furnaces, at a very small number of blast and heating furnaces.

Inspection of the Donetsk, Makeyevka, Yenakiyevo, "Azovstal'" and imeni Il'ich (city of Zhdanov) plants showed that the total extent of secondary power sources that can be additionally used at these enterprises reaches 2.2 million tons of relative fuel need.

The time has come to develop detailed fuel-energy balances at all power-consuming enterprises, not only of ferrous metallurgy, but of other branches as well. On their basis, specific ways of further efficiency promotion in the power economy, and specifically in the use of secondary power sources should be determined.

This problem seems to be most difficult in those branches where production is less concentrated, and the capacity of some units and furnaces is often small. Nevertheless, it is necessary to solve this problem.

All forms of transportation are developing in our country, and the number of various mobile powerplants in agriculture and construction is increasing. Technical progress is opening great opportunities for more economical use of power resources in this area.

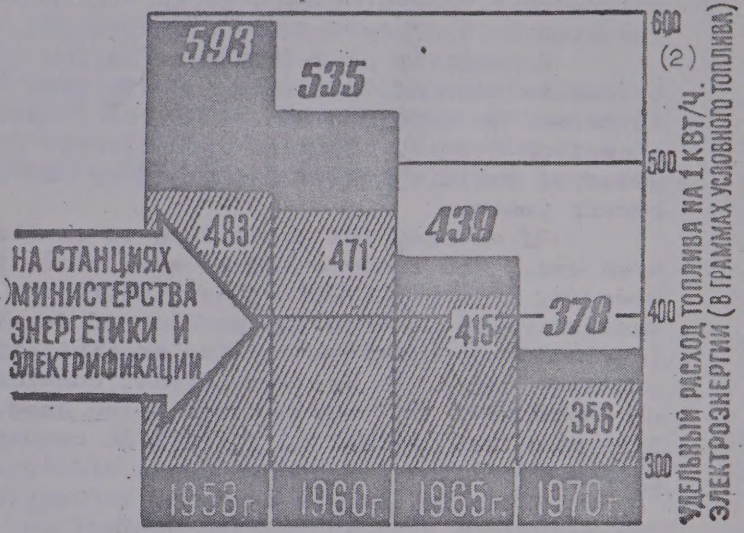
The shift of the railroads from steam power to electric and diesel power has already made it possible to save tens of millions of tons of fuel. Although during the seven-year period the volume of freight carried has increased by about one and a half times, the quantity of fuel used by the railroads has been almost cut in half. Figures of specific fuel consumption are most demonstrative. In 1958,273 kilograms of conventional fuel were required for 10,000 ton/km, but in 1965, the figure was only 114 kilograms.

Approximately the same results were obtained by modernization of the river and maritime fleet, the fuel ratio was reduced to less than half.

Today, together with the "traditional" ones, specialized forms of transportation such as pipelines and transmission of electric power by wire are being more and more developed.

A detailed study of the outlook for the overall development of all forms of transportation and a determination of their most economical combination are of considerable scientific and practical interest.

Diagram 4.
Reduction of the specific fuel consumption for the production of 1 kilowatt-hour of electric power for the seven-year period and according to the 1966-1970 plan. (Shown is the average consumption for all electric power stations of the country and the average consumption for the stations of the Ministry of Power and Electrification USSR.



1. At stations of the Ministry of Power and Electrification USSR.

2. Specific fuel consumption per kilowatt-hour of electric power (in grams of conventional fuel)

Reduce the losses of thermal energy.

Nearly one third of the fuel-energy resources are used for meeting the needs of the national economy in heat (steam, hot water, heater air). Although not nearly sufficient concern is devoted to the development of comprehensive thermal balances so far, still a number of projects undertaken by the USSR Gosplan/State Planning Committee/and in the Ministry of Power and Electrification of the USSR make it possible to describe the present and prospective structure of the thermal balance with a sufficient degree of accuracy. This is represented in the following table.

Consumers	Consumption of heat in percent of the annual total		
	1958	1965	1970
Industry and construction	50.5	52.5	54.8
Transportation	0.5	0.6	0.6
Agriculture (production needs)	0.7	2.5	3.2
Housing:			
urban	23.0	24.6	24.5
rural	25.3	19.8	16.9

In calculating the consumption of heat in 1970, it was taken into account that there are great possibilities for reducing the losses and lowering the total use of heat. For example, due to poor insulation of steam lines, heat-using installations and their inefficient operation alone cause a loss of 40 million tons of conventional fuel. And this is far from all. There are sufficient reasons to conclude that the reserves of possible thermal energy saving in industry have not been completely revealed in the preliminary calculations.

Especially poor is the situation of heat consumption in the area of public housing. Excessive consumption of heat (and consequently fuel) is caused by imperfection of building designs and defects in the construction itself. Specific expenditures for the heating of one cubic meter of buildings have increased by one and a half times and more in recent years.

Of course, the transition to smaller apartments, increase of glass area etc., are accompanied by some increase of specific heat consumption. However, this would not be as significant if the builders were more energetically solving the problem of developing walls with better heat insulating properties. And the possibilities of manufacturing light insulation materials are very great, considering the present development of chemistry. But they are not being used. The primary fault for this lies with the design and scientific research organizations of Gosstroy /State Committee for Construction Affairs/ of the USSR.

There is another cause of increased heat consumption in buildings. Our situation with installing devices for automatic heat regulation inside buildings is poor.

During the current five-year period it is planned to carry out efficiency measures for heat consumption not only in industry, but in public housing in cities and rural areas as well. Accounting for the production and consumption of thermal energy should be brought to a state of perfection, and control of it by the power distribution agencies should be increased.

Although a large number of heat and electric power stations will be built during 1966-1970, still, by the end of the five-year period, centralized heat supply will constitute 57.5 percent in industry, 25 percent in cities, and in rural areas only about 4 percent of total heat consumption. This situation is the result of greatly decentralized heat consumption in the majority of cities, settlements and rural areas.

Complete elimination of small industrial and residential boiler installations and heating stoves will not be accomplished soon. Yet, at a heat and electric power station, about 180 kilograms of conventional fuel are required for the production of one gigacalorie of thermal power, and the relative consumption is almost one and a half times greater in small heating plants and simple house stoves. Where, then, is the solution?

It is known that abroad (where central heating plants are less developed than in our country), small heating boilers with an efficiency of 80% have been developed and are in use. Evidently we should also organize mass production of such economical units with semi-automatic operation.

At the same time it will be necessary to organize production of high-quality fuel for them (peat briquets and size-graded coal). The

practice developed in the Latvian SSR, where peat briquets are produced and coal and wood are delivered to consumers in properly graded sizes, deserves becoming widespread.

In conslusion, a few words about using the methods of mathematical analysis and electronic computers for compillation of an optimal fuel-energy balance. Work in this direction is proceeding consistently and with determination. Evidently, we shall be in the nearest future able to practically apply the results of such theoretical studies.

Scientific, designing and planning organizations have the task of not only ensuring the attainment of set goals of developing power engineering during the current five-year period, but also of providing a scientific basis for the fuel-energy balance of the USSR for a long-term outlook.

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